REMARKS

This amendment substantially based on a draft amendment provided on March 22, 2006 is our response to the Office action dated February 6, 2006. Applicants amend the drawing, the specification and claims 1, 6, 16 and 25.

In an interview on March 28, 2006, Examiner Walter agreed the draft amendment which was the topic of the interview overcame the last Office action. Claims 1-32 are presented for examination. Applicants request reexamination and reconsideration of application.

In paragraph nos. 1-2 of the Office action, the Examiner gave the status of the claims and stated the amendment filed on November 15, 2005 necessitated new grounds of rejection which will be addressed below.

In paragraph no. 3, the Examiner objects to language in claims 16 and 25.

Applicants amend claim 16 as proposed to comply with the requirement of form set forth in the Office action. The amendment should be entered under 37 CFR 1.116(b)(1).

Applicants submit the objected to language is deleted by amendment (see above) so claim 25 satisfies the requirements set forth in the Office action.

In paragraph no. 4 of the Office action, the Examiner rejects claim 25 under 35 USC 102(e) as anticipated by US Patent No. 6,434,681 B1 to Armangau (Armangau).

In response, Armangau cannot anticipate or render obvious claim 25 as amended because claim 25 depends on allowed claim 14.

Amended claim 25 further recites the step of searching the bitmaps to identify snapshots that require the original data to be destaged occurs after the data storage system fails, and includes reading a bitmap, wherein if the bitmaps contain a value in a bit position representing the original data in cache memory, destaging the data to the target VLUN, and wherein if the bitmap contains an inverse value in the bit position representing the presence of the original data in the target VLUN, not destaging the original data.

1 In paragraph no. 5, the Examiner rejects claims 1, 2, 4, 6, 7, 12, 17, and 19 under 35

2 USC 103(a) as being unpatentable over Armangau in view of Cochran, US Published

3 Application No. 2004/0024961 A1 to Cochran.

4
5 As conceded at page 5 of the Office action, Armangau fails to disclose first and second
metadata locating an original data element of the first snapshot data and of the second
6 snapshot data at the same address in the target VLUN as recited in claim 1.
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8 The Examiner states Cochran teaches this feature. As Examiner describes it, Cochran's

9 first copy is made of three original data elements labeled "X" from the primary LUN to

10 the copy LUN. Next Cochran writes data element "Z" over the original data element in

11 the second location of the primary LUN, and makes a second copy of "Z" over the

12 original data element "X" in the copy LUN. The Examiner equates the first copy to a first

13 snapshot and the second copy to a second snapshot and concludes that the original

14 data element "X" in the first location is at the same address at the time of both the first

15 and second copy operations as recited in claim 1.

16 Cochran fails to describe multiple snapshots. In Cochran, the first copy of the primary

17 LUN corresponds to the source VLUN in claim 1. The second copy corresponds to the

18 first snapshot data of the source data of claim 1. However, Cochran fails to show any

19 structure that corresponds to the second snapshot data of the source data. See

20 paragraphs 0041-0045 and Figures 10A-10H.

21
22 Amended claim 1 captures these differences and would have been nonobvious over
Armangau and Cochran, because it requires a method of snapshot operation for a data
23 storage system with a first host that communicates with a cache memory, a source
24 Virtual Logical Unit Number (VLUN) containing source data and a target VLUN,
25 preserving first snapshot data of the source data at an instant in time and second
26 snapshot data of the source data at a later instant in time, wherein the first and second
27 snapshots after being taken persist concurrently, comprising:
28

29 generating first metadata to locate the first snapshot data and to indicate when a

30 data element of the first snapshot data is in the target VLUN; and

1   generating second metadata to locate the second snapshot data and to indicate

2   when a data element of the second snapshot data is in the target VLUN, wherein the

3   first and second metadata locate an original data element of the first snapshot data and

4   of the second snapshot data at the same address of the target VLUN.

5

6   Armangau and Cochran do not render obviousness amended claim 1. It is therefore
     submitted that claim 1 and its dependent claims 2 and 4 are allowable.

7

8   Amended claim 6 and its dependent claims 7 and 12 as well as claim 17 and its

9   dependent claim 19 distinguish over Armangau and Cochran for similar reasons

10   presented in connection with amended claim 1.

11   In paragraph no. 6, the Examiner states claims 14, 22, and 26-32 are allowed, but

12   claims 23-24 should be added as allowed since they depend from claim 22.

13

14   In paragraph no. 7, the Examiner states claims 3, 5, 8-11, 15-16, 18, 20-21, and 23-24

15   are objected to as being dependent on rejected base claims, but would be allowable if

16   rewritten in independent form.

17   The previous amendment rewrote dependent claims 3, 5, 8, 11, 18, 20, and 21 in

18   independent form as new claims 26-32, respectively, with minor modifications. Thus, the

19   objection now only relates to claims 9-10 and 15-16. Applicants have not rewritten

20   claims 9-10 and 15-16 since they depend from allowable claims. Separately, the

21   objection should be withdrawn against claims 23-24 since they depend from allowed

22   claim 22.

23

24   In paragraph no. 8, the Examiner objects to language in claim 25.

25   In paragraph no. 9, the Examiner further discusses his basis for rejecting claim 25 as

26   anticipated by Armangau.

27

28   In response to both paragraph nos. 8-9, applicants point to their amendment of claim 25
     and their brief remarks addressing paragraph no. 4 of the Office action.

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30   In paragraph no. 10, the Examiner states that US Published Application No.
     2003/0101321 A1 to Ohran (Ohran) is pertinent to applicants' disclosure.

1   Ohran does not prevent allowance of any claim.

2
    Please call to arrange an interview to discuss this reply or if you have any question,
3
    comment, or it will expedite prosecution.
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8   Respectfully Submitted,

9   *Robert Moll*

10

11   Robert Moll

12   Reg. No. 33,741

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IN THE DRAWINGS

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2. The enclosed drawing sheet is intended to replace the original sheet of Figure 7. In

3. Figure 7, applicants correct a typo in the subscript of data element A as indicated in the

4. enclosed mark up of Figure 7. The specification supports this correction, for example, at
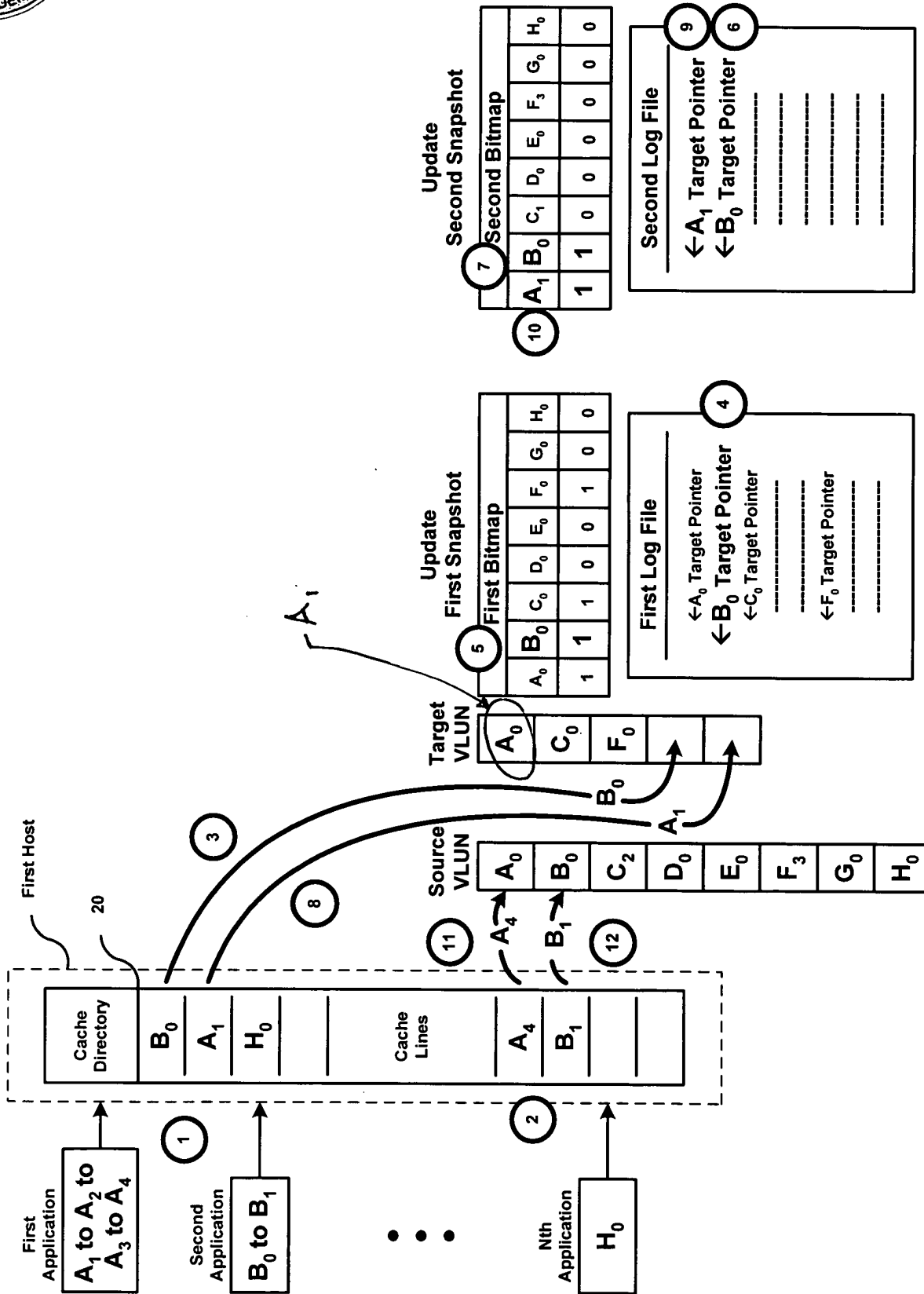
5. paragraph no. 0041.

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FIGURE 7